Background - Field of Invention:

[0001] This invention relates to switches and to the use of information symbols or scenes on MicroElectroMechanical System (MEMS) mirrors and/or on the exit mirrors of laser diode arrays and the like.

Background - Prior Art:

[0002] The use of binary switches and the resulting binary code have required that relatively long code strings be used to represent or transmit simple symbols.

[0003] Sakuma et al., U.S. Patent # 6,292,305 B1 disclose a virtual screen display apparatus and ... a relatively small image display for displaying characters or image information... [apparently of a size to be human observable] or "Means to create minuscule alphanumeric images by reflection and by/in the light pulse, for presentation on a real or virtual display screen" (from 2002, April 2 O.A.).

[0004] Lens systems to produce small images of varying magnification for detection by an electronic imaging system or "Lens systems for producing small images" (from 2002, April 2 O.A.) are disclosed by Betensky et al. (U.S. Patent 5,745,301).

[0005] An image processing apparatus for searching, storing, and displaying characters, sentence fragments, sentences or documents or "A device for searching any character string of a sentence input as an image" (from 2002, April 2 O.A.) is disclosed by Tanaka et al. (U.S. Patent 5,754,712).

[0006] An optical lens system and scanning device for reading and/or writing information in an information plane or "An optical scanning device for reading and writing information in an information plane" (from 2002, April 2 O.A.) is disclosed by Braat (U.S. Patent 6,317,276 B1).

[0007] The absolute/unique distinction between, the four patents referenced above (Sakuma et al., Betensky et al, Tanaka et al., and Braat) and "SUBMILLIMETER IMAGE SWITCHES", can be demonstrated by reference to Sakuma et al., U.S. Patent 6,292,305 B1, Sheet 15 of 20, FIG. 15. In the lower left corner of FIG. 15 is the term "IMAGE SIGNAL", to the left of that would be the purview of "SUBMILLIMETER IMAGE SWITCHES".

[0008] The same distinction would apply to the other three patents: Tanaka et al., U.S. Patent 5,754,712, Sheet 1 of 23, FIG. 1, upper left, "IMAGE INPUT UNIT", above that would be the purview of "SUBMILLIMETER IMAGE SWITCHES".

Betensky et al., U.S. Patent 5,745,301, ABSTRACT, First sentence, "Variable power lens systems for use with electronic imaging systems, e.g. systems employing CCDs, are provided." , would be synergistic with the purview of "SUBMILLIMETER IMAGE SWITCHES".

Braat, U.S. Patent 6,317,276 B1, ABSTRACT, Last sentence, "This lens system is very suitable for a scanning device and an apparatus for reading/writing high-density optical discs." , would be synergistic with the purview of "SUBMILLIMETER IMAGE SWITCHES".

[0009] "SUBMILLIMETER IMAGE SWITCHES" would likely be synergistic with OCR equipment.

Objects and Advantages:

[0010] Submillimeter information, including scenes and/or alphanumeric symbols, on the mirrors of MEMS switches, and/or the exit mirrors of laser diode arrays and the like, allow the representation, switching and/or transmission of submillimeter images with very short pulses of laser light.

[0011] One embodiment, an array of 256 submillimeter image switch elements (MEMS mirrors, laser diode arrays and the like) with submillimeter alphanumeric symbols on each switch element could function as an submillimeter alphanumeric image string switch.

[0012] The use of a, sequence label, in the switch address system would allow switching to any/all of the 256 image switch elements in any sequence, with each address operation. By including a, sequence plus time index label, the potential submillimeter alphanumeric image string can become extremely long for each address operation.

[0013] The advantage of submillimeter image switches would be the increased efficiency of directly switching, transmitting, manipulating, and storing information as submillimeter images of alphanumeric symbols or scenes, without the archaic conversion into binary code and the subsequent decoding.

Summary:

[0014] Submillimeter information symbols or scenes formed on MEMS mirrors and/or the exit mirrors of laser diode arrays and the like, allow these devices to function as submillimeter information image switches, producing a string of laser light pulses, each an image of a submillimeter information symbol or scene. These switches would be used in optronic/photonic devices and systems/networks.

Description:

[0015] Submillimeter information symbols or scenes, (reflective or nonreflective, positive or negative), are etched or formed onto the mirrors of MEMS switches and/or the exit mirrors of laser diode arrays and the like (other optical switch devices including liquid crystal devices). By selectively switching which MEMS mirror reflects a laser light pulse or which laser diode emits a laser light pulse, these devices function as submillimeter image switches.

Operation:

[0016] A light pulse reflected or emitted from a submillimeter image switch element would form an image of the symbol(s)/scene(s) on that element. The light pulse image could be directed into an optical fiber for transmission. Projection of the light pulse image onto a CCD chip (or screen) would provide readout. Storage might be recording of the symbol image directly onto a CD (or with light stopping methods of Rowland Institute).

Conclusion, Ramifications and Scope:

[0017] The limiting factor may be the number of photons necessary to form an image. Many paths toward that limit appear possible: for example, extremely small symbols, extremely short light pulses, multiple symbols on each switch element, lens systems, very high element number switches; i.e. current MEMS switches have 256 mirrors (possible symbols), frequency multiplexing; i.e. each frequency of the light pulse forming an image, and reflective symbols on a nonreflective background. Alternatively: symbols might be formed directly onto the exit mirrors of lasers such that the laser pulse, itself, is the image; or images created by passing the light pulse through an image medium. Eventually, a image may be worth a thousand bits.